

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A mechanical coupling for coupling a rotatable driving element to a rotatable driven element to be driven by the
5 driving element, wherein the mechanical coupling comprises:

a clutch mechanism, mechanically between the driving element and the driven element; and

wherein the clutch mechanism is adjustable so that in
10 normal use the driving element can drive the driven element substantially without slippage, but so that a given torque applied to said driven element, other than via the clutch, in order to override the action of the driving element, causes the clutch mechanism to slip,
15 thereby overriding said driving element and allowing the driven element to be driven by the overriding torque, substantially without said overriding torque being applied to the driving element.

2. A mechanical coupling as claimed in claim 1, wherein,
20 in use, the clutch is adjustable so that the overriding torque is of a magnitude that can be manually applied to the driven member.

3. A mechanical coupling as claimed in either preceding claim wherein, in use, the clutch is adjusted so that the
25 clutch mechanism can slip to prevent transmission of torque greater than a given predetermined torque, from the driving element to the driven element.

4. A mechanical coupling as claimed in any preceding claim, wherein the driven element is a shaft.

30 5. A mechanical coupling as claimed in claim 4, wherein the shaft is elongate, being greater in axial length than in radial width.

6. A mechanical coupling as claimed in any preceding

claim, wherein the driven element is a steering shaft of a vehicle.

7. A mechanical coupling as claimed in any of claims 1 to 5, wherein the driven element is a member for rotational connection to, and driving of, a shaft.

8. A mechanical coupling as claimed in any preceding claim, wherein the mechanical coupling includes a secondary driving element which, in use, is provided mechanically between the driving element and the clutch mechanism.

9. A mechanical coupling as claimed in claim 8, wherein, in use, the secondary driving element is rotatable substantially coaxially with the driven element.

10. A mechanical coupling as claimed in either of claims 8 or 9, wherein there is provided a link for connecting the driving element to the secondary driving element.

11. A mechanical coupling as claimed in any of claims 8 to 10, wherein the driving element is connected to the secondary driven element via a gear mechanism.

12. A mechanical coupling as claimed in claim 11 when dependent upon claim 10, wherein the link includes, constitutes or forms part of the gear mechanism.

13. A mechanical coupling as claimed in any preceding claim, wherein the clutch mechanism includes a first clutch element which, in use, is rotationally coupled to, and driven by, the driving element, and a second clutch element which, in use, is rotationally coupled to the driven element, and the clutch mechanism is adapted to allow relative rotation of the first and second clutch elements when the overriding torque is applied to the second clutch element.

14. A mechanical coupling as claimed in any preceding claim wherein the clutch mechanism is configured to fit

around a shaft.

15. A mechanical coupling as claimed in claim 14, wherein the clutch mechanism includes a clutch plate with a central void for passage of the shaft.

5 16. A mechanical coupling as claimed in any preceding claim, wherein operation and adjustment of the clutch is regulated by an electronic control system.

10 17. A mechanical coupling as claimed in any preceding claim which is provided with a fluid controlled system for adjustment of the clutch.

18. A mechanical coupling as claimed in claim 17, wherein the fluid controlled system includes a fluid chamber.

19. A mechanical coupling as claimed in claim 18, wherein the fluid chamber is configured to fit around a shaft.

15 20. A mechanical coupling as claimed in either of claims 18 or 19, wherein a piston is provided in the fluid chamber and wherein varying the fluid pressure varies a force applied via the piston to rotationally couple first and second clutch elements of the clutch mechanism.

20 21. A mechanical coupling as claimed in claim 20, wherein the fluid controlled system adjusts the clutch by regulating the fluid pressure which acts upon the piston.

22. A mechanical coupling as claimed in claim 8 or any claim dependent thereon, wherein the secondary driving element is configured to fit around a shaft.

25 23. A mechanical coupling as claimed in claim 13 or any claim dependent thereon, wherein the clutch mechanism has a clutch housing and at least part of the housing drives, or forms at least part of, one of the clutch elements.

30 24. A mechanical coupling as claimed in claim 13 or any claim dependent thereon, wherein there is provided a connection element which extends through a passageway defined by the fluid chamber, and into the clutch

mechanism, and wherein part of the connection member is driven by or forms at least part of one of the clutch elements.

25. A mechanical coupling as claimed in claim 24, wherein
5 the connection element is configured to fit around a shaft.

26. A mechanical coupling as claimed in either of claims 24 or 25, wherein the connection element includes a shaft portion.

10 27. A mechanical coupling as claimed in claim 20 when including the features of claim 13, wherein application of fluid pressure to the piston forces the piston away from one end of the fluid chamber, and where the increased displacement between the piston and the said one end of 15 the fluid chamber forces the clutch elements into, or towards, an engaged configuration.

28. A mechanical coupling as claimed in any preceding claim, wherein the torque applied to the driven element other than via the clutch mechanism is applied manually 20 via a steering wheel or other steering element.

29. A mechanical coupling as claimed in claim 17 or any claim dependent thereon, wherein the fluid controlled system is operable from a pump used for the power steering system of the vehicle.

25 30. A system for coupling an automatic steering control system to a steering system of a vehicle, while allowing manual override of the automatic steering control system by a user operating the normal steering control of the vehicle, said system including a mechanical coupling as 30 claimed in any preceding claim.

31. A system as claimed in claim 30, wherein the clutch is adjusted by a computerised controller.

32. A system as claimed in claim 31, wherein the

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computerised controller which adjusts the clutch also operates the automatic steering control system.

33. A method of coupling a rotatable driving element to a rotatable driven element, to be driven by the driving
5 element, comprising the steps of:

providing a clutch mechanism, mechanically between the driving element and the driven element, so that the driven element may be driven by the driving element via the clutch mechanism; and

10 adjusting the clutch mechanism so that, in normal use, the driving element can drive the driven element substantially without slippage, but so that a given torque applied to said driven element other than via the clutch mechanism, in order to override the action of the driving
15 element, causes the clutch mechanism to slip, thereby overriding said driving element and allowing the driven element to be driven by the overriding torque, without said overriding torque being applied to the driving element.

20 34. A method as claimed in claim 33, wherein the step of adjusting the clutch mechanism includes adjusting the clutch mechanism so that the torque transmissible by the clutch mechanism without slippage is greater than the torque required to allow the driving element to drive the
25 driven element in normal use, but less than the given overriding torque.

35. A method as claimed in either of claims 33 or 34, wherein the step of adjusting the clutch mechanism includes adjusting the clutch mechanism during rotation of
30 the driving element.

36. A method as claimed in any of claims 33 to 35, wherein the step of adjusting the clutch mechanism includes adjustment so that the overriding torque is of a magnitude

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that can be manually applied to the driven member.

37. A method as claimed in claim 36, wherein the driving element is an output of an automatic steering system for a vehicle, and the driven element controls the steering of the vehicle.

38. A method as claimed in claim 37, wherein the driven element is one of: a steering shaft of the vehicle; and, an auxiliary element connected to the steering shaft of the vehicle.

10 39. A method as claimed in either of claims 37 or 38, wherein the torque applied to the driven element other than via the clutch mechanism is applied manually via a manually operated steering controller.

15 40. A method as claimed in any of claims 33 to 39, wherein the method includes the step of detecting relative rotation of the driving element and the driven element which corresponds to the driving element being overridden, and least partially releasing the clutch mechanism in response to the detection of the relative rotation.

20 41. A method as claimed in any of claims 33 to 39, which includes use of a mechanical coupling as claimed in any of claims 1 to 29, and/or which includes use of a system as claimed in any of claims 30 to 32.